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A RESEARCH STUDY OF AGRICULTURAL TECHNICIANS.

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QUESTIONNAIRES WERE MAILED TO 297 BUSINESS FIRMS TO DETERMINE THE CHARACTER OF THE WORK FORCE, THE TURNOVER OR OPENINGS ANNUALLY, THE JOB QUALIFICATIONS REQUIRED TO FILL THE JOBS, AND THE TRAINING PROGRAMS NEEDED TO PREPARE STUDENTS FOR THE OCCUPATIONS IN AGRICULTURAL BUSINESSES, GOVERNMENTAL AGENCIES, AND FARMS IN THE COLLEGE OF THE SEQUOIAS DISTRICT. OF 151 RESPONDONG FIRMS, THE 131 TO BE INTERVIEWED WERE SELECTED TO PROVIDE GEOGRAPHICAL BALANCE AND A VARIETY OF BUSINESSES. SOME FINDINGS WERE--(1) THE GREATEST NUMBER OF AGRIBUSINESS FIRMS REPORTING WERE IN THE SALES AND SERVICE, PROCESSING, AND MARKETING AREAS, (2) THE ESTIMATED PERSONNEL NEEDS OF THE NEXT 5 YEARS WERE HIGHEST IN THE UNSKILLED LABOR CATEGORY, AND (3) 30 PERCENT OF THE 151 FIRMS INDICATED A DESIRE TO HAVE THEIR EMPLOYEES TAKE EVENING CLASSES AT THE COLLEGE OF THE SEQUOIAS. IT WAS CONCLUDED THAT THERE WAS A DEFINITE NEED FOR AGRICULTURALLY TRAINED PEOPLE IN THE DISTRICT. A BASIC PATTERN OF COURSES INCLUDING ENGLISH AND APPLIED MATHEMATICS WAS DESIRED BY EMPLOYEES TO SUPPLEMENT SPECIALIZED TRAINING OFFERED TO TRAINEES. BECAUSE EMPLOYMENT OPPORTUNITIES WERE SO VARIED, GENERAL COURSE PATTERNS SHOULD BE SET UP WITH SPECIALIZATION OFFERED THROUGH ELECTIVE COURSES. SAMPLE 2-YEAR CURRICULUMS FOR AGRICULTURAL TECHNICIANS ARE INCLUDED. (WB)

A RESEARCH STUDY OF AGRICULTURAL TECHNICIANS

This project was co-operatively sponsored by the College of the Sequoias, the Bureau of Agricultural Education, and the National Defense Education Act, under Title VIII, P. L. 864, 85th Congress, in 1964.

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OFFICE OF EDUCATION

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PREFACE

The importance of agriculture to the economy of California and specifically to the College of the Sequoias District is a well accepted fact. Changes in agriculture in the past decade have been very evident. These changes have prompted those in agricultural education to re-evaluate their programs and to provide training for those in agriculture off the farm as well as those in production agriculture.

As changes are adopted in agriculture, there is a need for a new and a better trained work force with more skill and technical knowledge than was previously required. The scope of this labor force and the requirements for their employment prompted this survey.

Appreciation is extended to the businesses and farms who helped furnish the data for this study.

The College of the Sequoias Agricultural Advisory Committee furnished valuable assistance in the preparation of the questionnaire, interpretation of the findings, and analysis of the study. For the assistance given, appreciation is extended to the following:

Sheldon Jackson, Chairman	Tom Gist
Arleigh Peterson, Vice Chairman	Bill Silveira
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Don Montgomery	John Knight Jr.
Edward Griswold	Eugene Fleming

Appreciation is also extended to Frank Lawhorn, College of the Sequoias agriculture instructor, for conducting the interviews and compiling the results; Dr. Jon Hondrum, College of the Sequoias Dean of Instruction; and Dr. Wilbur Ball, Fresno State College Senior Vocational Instructor in Agriculture, for advice on the survey.

Appreciation is further expressed to the Board of Trustees and the Administration of the College of the Sequoias for the leadership and interest in the development and conduct of this study.

Bruce F. Jensen

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I. **PROJECT TITLE:** A research study to determine the need and the type of training program for agricultural technicians in the College of the Sequoias District.

II. **PURPOSE OF STUDY:** To determine the character of the work force, the turn-over or openings annually, the job qualifications needed to fill the jobs, and a study of the training programs needed to prepare students for the occupations in agricultural business, governmental agencies, and farms in the College of the Sequoias District.

III. **PROCEDURE:** The idea of a study of this type originated with the College of the Sequoias Agriculture Department. Application was made to the State Department of Education for NDEA funds to assist in financing the project.

A questionnaire was developed by the College of the Sequoias Agriculture Department with the assistance of Dr. Jon Hondrum, College of the Sequoias Dean of Instruction, and Dr. Wilbur Ball, Fresno State College Senior Vocational Instructor in Agriculture. The questionnaire was mailed to five business firms as a pilot study, and minor revisions and clarifications were made on the amended questionnaire.

A list of 297 businesses was compiled with the assistance of Chambers of Commerce, vocational agriculture teachers, telephone directories, and personal contacts. The questionnaire was then mailed to the businesses with an accompanying letter of explanation.

The College of the Sequoias received responses from 151 of the total sent which is a 51 per cent return. Of this 151, 131 were personally interviewed. In the selection of the firms interviewed, an effort was made to include a geographical balance as well as a variety of businesses.

The report on the findings of this survey is based upon the completed questionnaires. No effort has been made to extend the figures to represent the entire population.

IV. **RESULTS OF SURVEY:**

A. Breakdown of businesses and individuals who responded:

CLASSIFICATION	Number of Questionnaires Sent Out	Per cent of Total	Number Returned	Per cent Returned
Pest Control	1	1.*	1	100
Irrigation Districts	4	1.3	4	100
State Agencies	3	1.	3	100
Wineries	2	1.*	2	100
Feed Mfrs. & Dealers	9	3.	8	90
Land Surveying & Leveling	4	1.3	3	75
Federal Agencies	7	2.3	5	70
Livestock Marketing Assn.	3	1.	2	66
Veterinarians	6	2.	4	66
Packing Houses	38	12.7	23	60
Nurseries (Whsle. & Retail)	13	4.4	7	54
Fertilizers & Insecticides	19	6.4	10	53
Concrete Products	2	1.*	1	50
Cotton Gins	10	3.3	5	50
County Agencies	2	1.*	1	50
District Agencies	2	1.*	1	50
Meat Packing	2	1.*	1	50
Farming	46	15.	22	48
Farm Equipment Dealers	25	8.3	12	48
Mfg. & Repair of Farm Equip.	23	7.7	10	43
Banks	18	6.3	7	39
Dairy Manufacturing	10	3.3	3	33
Commercial Spraying	13	4.4	4	30
Trucking	8	2.7	2	25
Artificial Breeders	5	1.6	0	0
Fruit & Veg. Buyers	1	1.*	0	0
Hay & Grain Dealers	1	1.*	0	0
Packing House Equipment	1	1.*	0	0
Soil Test. Laboratories	2	1.*	0	0
Gasoline Distributors	1	1.*	0	0
Miscellaneous	13	4.4	10	69
Total	297		151	51%

*Denotes less than 1%

B. Kind of firms reporting (some checked more than one category):

FARMING

Number	Type
22	Citrus
17	Deciduous Fruits & Nuts
16	Field Crops
12	Grapes
9	Meat Animals
6	Dairy
17	Other

AGRICULTURE - BUSINESS

Number	Type
42	Sales & Service
41	Processing
30	Marketing
16	Purchasing & Sales
12	Service Only
8	Purchasing & Service
4	Sales Only
3	Purchasing Only
41	Other

C. Number of years firm in business:

Firms	Years
86	20 Plus
19	15 - 20
12	1 - 3
10	10 - 15
8	4 - 6
6	6 - 10
9	Not listed

D. Level of employment of present employees, salary data, and total in each category:

	Total Employees on Monthly Salary	Lowest Monthly Salary	Highest Monthly Salary	Total Employees on Hourly Salary	Lowest Hourly Salary	Highest Hourly Salary	Total Employees for Classification
Unskilled Laborer	544	$200.	$ 463.	1,871	$1.10	$3.17	2,415
Skilled Laborer*	245	250.	708.	939	1.23	4.50	1,184
Accountant & Bookkeeper	239	166.	1,200.	16	1.25	2.80	255
Foreman	219	300.	900.	61	1.35	3.55	280
Semiskilled Laborer**	201	250.	666.	729	1.25	3.35	930
Supervisor & Manager	168	400.	1,800.	0	0	0	168
Salesman Only	146	350.	1,500.	0	0	0	146
Clerk & Secretary	134	200.	620.	37	1.25	2.81	171
Serviceman Only	131	250.	1,084.	27	1.50	2.75	158
Salesman & Serviceman	34	350.	1,800.	0	0	0	34
Management Trainee	19	300.	834.	0	0	0	19

*Does not include category labeled "Other" or seasonal employees

**House furnished in several instances

E. Estimated personnel needs of the future (5 year period 1964-1969):

Number	Category
905	Unskilled Labor
618	Skilled Labor
313	Semiskilled Labor
139	Clerical & Secretarial
133	Accounting & Bookkeeping
104	Foremen
93	Sales Only
62	Service Only
52	Supervisory-Managerial
49	Management Trainee
258	Other

F. Technical and basic training required by classifications:
Number in each category:

TECHNICAL TRAINING	Accounting & Bookkeeping	Clerical & Secretarial	Foremen	Semiskilled Labor	Skilled Labor	Unskilled Labor	Management Trainee	Sales Only	Service Only	Supervisory Managerial	Other	Total
Farm Machinery	2	2	12	16	17	1	8	11	9	9	3	91
Agricultural Math.	12	6	10	7	8	1	10	15	6	10	4	87
Farm Mech. Skill	1	2	13	14	21	5	6	8	9	6	1	86
Welding	0	1	20	15	21	2	3	2	10	2	1	76
Soils	1	2	11	3	5	0	8	22	1	7	4	64
Irrigation	1	1	12	8	7	2	8	10	3	9	4	63
Farm Power	0	2	9	10	13	2	3	5	9	6	2	62
Farm Management	3	3	14	1	3	0	12	11	3	8	5	61
Fertilizers	2	1	10	2	6	1	6	21	1	8	3	61
Farm Accounting	10	6	5	2	3	1	11	12	4	10	4	59
Entomology	1	2	4	4	5	0	5	15	2	8	5	51
Marketing	2	2	5	0	0	0	7	15	2	11	4	47
Citrus Production	3	3	8	1	3	0	4	7	3	5	4	41
Weeds	0	1	5	5	4	1	2	12	1	7	3	39
Agronomy	1	1	1	1	2	0	8	9	3	7	6	32
Farm Surveying	0	1	8	2	2	0	4	3	2	5	5	32
Horticulture	0	1	5	1	1	0	3	8	1	6	3	29
Animal Husbandry	0	1	4	2	2	0	5	3	2	4	6	28
Plant Propagation	2	2	3	1	1	0	2	8	1	3	2	25
Dairy Production	0	1	1	2	1	1	7	2	2	5	2	24
Viticulture	1	2	3	0	2	0	4	3	1	4	3	23
Feeds & Feeding	0	1	1	1	1	1	2	7	1	5	2	22
Farm Structures	0	1	3	1	4	0	3	0	1	3	1	17
Vegetable Production	0	1	1	0	0	0	1	2	1	1	1	8
Other	1	1	2	2	0	0	2	2	3	0	1	14

F. Technical and basic training required by classifications - contd.

BASIC TRAINING SCIENCE	Accounting & Bookkeeping	Clerical & Secretarial	Foremen	Semiskilled Labor	Skilled Labor	Unskilled Labor	Management Trainee	Sales Only	Service Only	Supervisory-Managerial	Other	Total
Chemistry	0	1	9	3	5	1	6	12	4	8	4	53
Botany	1	0	6	3	4	0	2	11	1	6	4	38
Physics	0	1	5	1	3	1	3	7	3	4	3	31
Bacteriology	0	1	6	2	2	1	2	4	1	5	5	29
Biology	0	0	4	1	2	0	1	5	1	4	5	23
Zoology	0	1	0	0	1	0	1	0	1	2	4	10
Geology	0	0	0	0	0	0	0	3	1	0	1	5
Meterology	0	0	0	0	0	0	0	0	1	0	1	2

MATHEMATICS

Math. General	20	13	18	15	18	3	10	25	9	11	9	151
Algebra	4	3	12	4	3	0	8	12	3	5	7	61
Geometry	2	1	4	3	2	0	7	6	3	9	4	41
Algebra Intermediate	2	2	5	1	2	0	6	5	2	9	3	37
Trigonometry	1	1	3	0	3	0	4	2	1	5	3	23
Calculus	1	0	2	0	2	0	2	1	1	3	2	14

F. Technical and basic training required by classifications - contd.

ENGINEERING	Accounting & Bookkeeping	Clerical & Secretarial	Foremen	Semiskilled Labor	Skilled Labor	Unskilled Labor	Management Trainee	Sales Only	Service Only	Supervisory-Managerial	Other	Total
Mechanics Elementary	1	1	16	14	19	3	10	9	7	9	6	95
Machine Shop	1	1	16	14	19	3	7	6	8	5	5	85
Drawing Elementary	3	1	4	4	5	1	3	6	2	3	7	39
Drawing Advanced	0	0	1	2	6	1	4	4	2	3	5	28

BUSINESS												
Accounting	46	24	4	4	2	0	17	13	4	11	4	129
Typing	46	33	1	2	2	0	5	9	2	7	2	109
Business Law	26	15	2	1	2	0	12	15	3	12	3	91
Salesmanship Marketing	4	2	2	0	2	0	12	28	3	9	5	67
Salesmanship Retailing	1	1	1	0	4	0	8	25	3	5	3	51
Advertising	5	2	0	0	1	0	5	6	2	6	0	27
Other	8	12	1	1	1	0	0	1	0	0	0	24

F. Technical and basic training required by classifications - contd.

HUMANITIES - SOCIAL STUDIES	Accounting & Bookkeeping	Clerical & Secretarial	Foremen	Semiskilled Labor	Skilled Labor	Unskilled Labor	Management Trainee	Sales Only	Service Only	Supervisory-Managerial	Other	Total
English	19	20	10	14	9	2	11	21	6	12	6	130
Speech	9	8	7	9	11	1	15	28	7	13	6	114
Economics	5	4	5	5	3	0	11	16	4	10	5	68
Psychology	4	3	7	5	2	0	6	17	4	7	4	59
Foreign Language	1	1	4	1	3	0	2	3	1	4	3	23
Sociology	2	3	1	1	1	0	2	3	1	3	1	18
Literature	1	1	2	1	1	0	2	2	1	1	1	13

G. Employees needed in the next five years by classifications:

	Accounting & Bookkeeping	Clerical & Secretarial	Foremen	Semiskilled Labor	Skilled Labor	Unskilled Labor	Management Trainee	Sales Only	Service Only	Supervisory-Managerial	Other	Total
Packing Houses	17	27	23	127	126	335	10	7	2	9	4	687
Farming	17	6	14	140	70	197	5	4	0	4	2	459
Fertilizers & Insect.	22	20	30	76	13	8	1	30	29	10	107	346
Mfg. & Rep. Farm Equip.	10	6	7	37	42	60	4	11	4	2	1	184
Federal Agencies	0	4	0	76	0	2	1	0	2	2	59	146
Commercial Spraying	5	5	5	30	10	50	0	3	0	2	0	110
Farm Equip. Dealers	12	5	5	20	17	3	3	15	12	10	5	107
Cotton Gins	8	4	7	2	0	50	3	2	0	2	0	78
Banks	19	28	2	0	0	0	10	0	1	7	10	77
Feed Mfrs. & Dealers	5	4	1	6	7	17	5	8	1	0	0	54
Trucking	1	1	2	40	5	2	0	1	0	1	0	53
County Agencies	0	0	0	0	0	0	0	0	0	0	50	50
Dairy Manufacturing	1	6	1	14	3	10	0	5	0	0	0	40
Land Survey. & Level.	0	2	4	6	2	4	0	0	1	1	5	25
Nurseries (Whsle. & Ret.)	2	0	0	3	5	9	0	4	0	0	0	23
District Agencies	0	0	0	5	0	0	0	0	0	0	10	15
Wineries	2	2	0	2	2	2	1	0	0	0	0	11
Veterinarians	1	2	0	3	0	0	0	0	0	0	2	8
Meat Packing	0	0	0	1	2	0	0	1	0	0	3	7
State Agencies	1	0	0	4	0	0	0	0	2	0	0	7
Irrigation Districts	1	0	0	0	2	0	0	0	0	0	0	3
Livestock Mktg. Assn.	0	0	0	0	0	0	2	0	0	1	0	3
Pest Control	0	1	0	0	0	0	0	0	2	0	0	3
Miscellaneous	9	16	3	26	7	156	4	2	6	1	0	230
Totals	133	139	104	618	313	905	49	93	62	52	258	2726

H. Per cent of firms that indicated a desire to have their employees take evening classes at College of the Sequoias:

1. 30 per cent of 151 responded yes.
2. 34 per cent of 151 responded no.
3. 36 per cent of 151 gave no response.
4. It was reported by the employers that they would have 120 employees that are (or will be) taking night school classes.
   a. Courses recommended for night school that are not presently being taught:
      Advanced Welding
      Agri-Business
      Am. Inst. of Banking course
      Animal Husbandry
      Citrus Production
      Diesel Engines
      Electricity
      Entomology
      Farm Law
      Farm Management
      Feeds and Feeding
      Fertilizers
      Hydraulics
      I.B.M. Machines
      Irrigation
      Marketing
      Public Relations
      Refresher Courses
      Refrigeration
      Salesmanship
      Soils
      Surveying
      Weeds

I. Source of new employees:
   Number of firms using media:
   69 Recommendation of friends
   42 Direct contact with people in other businesses
   35 State employment service
   23 Advertisement in local newspapers
   19 Recommendation of present employer
   18 High schools
   15 College employment service
   10 College of the Sequoias
    4 Advertisement in trade journals
   45 Other

J. Educational activities this company is willing to participate in to help train College of the Sequoias students:

102 Permit students to visit plants or farms to observe operations

64 Release key employees to talk to student groups

62 Work with college personnel in outlining the type of program which would help prepare persons for work in agricultural industries.

52 Employ interested students during vacation period

30 Work with school on in-service training for present employees

29 Employ interested students on part-time basis during school year.

V. CONCLUSIONS - RECOMMENDATIONS:

1. There is a definite need for agriculturally trained people in the College of the Sequoias District.

2. The following is a definition by Mr. Jerry Halterman in his study "Technicians in Agriculture":

> "An individual who through an extended period of specialized training beyond high school, but less than that required for a B. S. degree, in the field of agriculture science and those areas of instruction which support it, (training may include, but not be limited to, courses in business, education, language arts, mathematics, engineering, physical science, chemical science, biological science, and social science), has acquired the skill and ability to make practical applications of theoretical knowledge in performing specific tasks in the production of goods and services in agriculture."

   Using this definition, the advisory committee feels that all of the categories listed under E (personnel needs of the future) would qualify as agriculture technicians except unskilled labor. This decision is based upon an understanding of the job requirements of those categories and the employers' judgment of courses required of personnel for those positions.

3. The pattern of the responses to courses required for employment in the various categories as shown in Section F would indicate that a basic or broad pattern of courses to supplement the specialized training is desired by employers.

4. The emphasis placed on English as a requirement would indicate a deficiency in that area. The agriculture department should require more term papers and reports and give more essay examinations to further train in this area.

5. More students shoud be urged to take mathematics courses such as Agriculture 92 (Agriculture Mathematics) to meet the need pointed out in the tabulation of required courses.

6. The need for the ability to converse with people, to take supervision, and to be able to supervise others (get along with people) was a common comment from employers. Stress on participation in the Agriculture Club and club and community activities should be made.

7. Most of the agriculture courses checked as required for employment are now being offered by the College of the Sequoias. The exception is a course in Farm Welding, which was checked by one-half of the employers. This unit should be taken from our Farm Mechanics Skills class (Agriculture 50) and be made into a separate course.

8. An effort needs to be made to acquaint employers with the Junior College program. Only ten listed the College of the Sequoias as a source of new employees.

9. A feeling of interest and co-operation between employers and the College of the Sequoias Agriculture Department was evidenced by the responses to Section J (activities this company is willing to participate in to help train College of the Sequoias students).

10. The employment opportunities are so varied that rather than attempting to be too specific or restrictive in the curriculum, general course patterns should be set up with specialization offered through the electives.

11. Sample two-year curriculum for technicians in agriculture:

AGRICULTURE ENGINEERING TECHNICIAN

FRESHMAN

FALL	Units	SPRING	Units
English	3	Speech	3
P. E.	½	P. E.	½
History	3	Pol. Sci. 5	3
Ag. 50 (Basic Farm Mech.)	2	Ag. 51 (Farm Machinery)	3
Ag. 92 (Agri. Math)	2	Ag. 57 (Welding)	3
Electives	5	Electives	3
	15½		15½

SOPHOMORE

FALL	Units	SPRING	Units
Ag. 52 (Irrigation)	3	Ag. 53 (Farm Power)	3
Ag. 55a (Proj. Constr.)	3	Ag. 54 (Farm Surveying)	2
Hygiene I	2	Ag. 55b (Proj. Constr.)	3
Ind. Arts 10a (Mach. Shop)	3	Ind. Arts 10b (Mach. Shop)	3
P. E.	½	P. E.	½
Electives	4	Electives	4
	15½		15½

AGRI-BUSINESS TECHNICIAN - SALES

FRESHMAN

FALL	Units	SPRING	Units
English	3	Speech	3
Chem. 2a (Gen. Chem.)	3	Chem. 2b (Gen. Chem.)	3
Ag. 82 (Econ. Entomology)	3	Ag. 91 (Farm Accounting)	3
Ag. 92 (Agri. Math.)	2	History 10	3
Bus. 70 (Salesmanship)	3	P. E.	½
P. E.	½	Electives	3
Electives	2		15½
	16½		

SOPHOMORE

FALL	Units	SPRING	Units
Pol. Sci. 5	3	Ag. 85 (Weeds)	3
Ag. 87 (Soils)	3	Ag. 90 (Farm Management)	4
Bus. 18 (Bus. Law)	3	Ag. 93 (Mktg. Farm Products)	3
Econ. 1a	3	Ag. 83 (Fertilizers)	3
Ag. 52 (Irrigation)	3	Hygiene 1	2
P. E.	½	P. E.	½
	15½		15½

PLANT SCIENCE TECHNICIAN

FRESHMAN

FALL	Units	SPRING	Units
Chem. 2a (Gen. Chem.)	3	Chem. 2b (Gen. Chem.)	3
Ag. 88 (Citrus Fruits)	4	Ag. 91 (Farm Accounting)	3
Ag. 82 (Econ. Entomology)	3	History 10	3
Ag. 92 (Agri. Math.)	2	Speech	3
English	3	Ag. 83 (Fertilizers)	3
P. E.	½	P. E.	½
	15½		15½

SOPHOMORE

FALL	Units	SPRING	Units
Ag. 87 (Soils)	3	Ag. 90 (Farm Management)	4
Ag. 52 (Irrigation)	3	Hygiene 1	2
Ag. 50 (Basic Farm Mech.)	2	Ag. 85 (Weeds)	3
Pol. Sci. 5	3	Ag. 51 (Farm Machinery)	3
Electives	4	Electives	3
P. E.	½	P. E.	½
	15½		15½